UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/550,649	04/17/2000	Jarod Guertin	CNA-029	1375

2292 7590 12/13/2005

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
KIM, DAVID S	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/550,649	GUERTIN ET AL.	
	Examiner	Art Unit	
	David S. Kim	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 June 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Applicant's compliance with the objections to the drawings in the previous Office Action (mailed on 14 March 2005) is noted and appreciated. Applicant's responded by filing a replacement drawing sheet for Fig. 2 on 13 June 2005. This drawing is disapproved. The location of the box for reference character 300 of RX_N of element 112 is in the wrong location. That is, for consistency with the other RX units of element 112, this box should be located in the upper left corner of RX_N, not the lower left corner. For example, the version shown in the Annotated Sheet of Fig. 2, also filed on 13 June 2005, correctly shows the location of this box in the upper left corner.

Specification

2. Applicant's compliance with the objections to the specification in the previous Office Action (mailed on 14 March 2005) is noted and appreciated. However, some minor informalities remain:

On p. 3, 2nd full paragraph, "less the specified BER" is used where -- less than the specified BER -- may be intended.

Appropriate correction is required.

Claim Objections

3. Applicant's compliance with the objections to the claims in the previous Office Action (mailed on 14 March 2005) is noted and appreciated. Accordingly, the objections to claims 21-22 are withdrawn.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Juniper

6. **Claims 1-2, 12-14, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-operating with the CIENA MultiWave Sentry DWDM System") in view of the admitted prior art (hereinafter "the APA") and Waschka, Jr. (U.S. Patent No. 4,449,247).

Regarding claim 1, Juniper discloses:

A method of testing a bit error rate for each of a plurality (*N*) of (multiple spans in Fig. 9) optical communication channels, *N* being greater than 2, in a wavelength division multiplexed optical communication system (the Sentry DWDM system is a WDM system) having *N* optical transmitters (transmitter modules in Sentry 1600, not shown) communicating to *N* optical receivers (receiver modules in Sentry 1600, not shown) via *N* communication channels, the *N* optical receivers being co-located (co-location in a Sentry module in Fig. 9) with each other and with the *N* optical transmitters for testing the method comprising:

cascading (concatenated spans in Fig. 9) said *N* optical communication channels such that an electrical (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters) output of an optical receiver *i* for an optical communication channel *i* is connected to an input of an optical transmitter *i+1* for an optical communication channel *i+1*, for all values of *i* from one to *N-1*, so as to form a continuous cascade of a co-located plurality of optical transmitter/receiver pairs (cascaded transmitter/receiver pairs implied in Fig. 9);

supplying (signal from BERT on p. 8) a bit error rate test signal from a bit error rate tester (BERT on p. 8) to an input for a first optical transmitter for a first optical communication channel;

supplying (implied by return of BERT test signal from concatenated spans to BERT unit on p. 8) the bit error rate test signal from an output of optical receiver *N* to the bit error rate tester.

Juniper does not expressly disclose:

detecting errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured system bit error rate.

However, such detecting is the general purpose of BERT units, such as in the one mentioned on p. 8 of Juniper. Although the system in the method of Juniper was tested as error free, if the system were further lengthened so that the errors would start to appear, then the BERT of Juniper would detect such errors. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to further lengthen the transmission distance or to further increase the number of spans of Juniper. One of ordinary skill in the art would have been motivated to do this for the common purpose of finding out the transmission limits of the system, such limits being correlated to detected errors.

Juniper also does not expressly disclose:

comparing the measured system bit error rate with a predetermined system bit error rate threshold;

monitoring a signal quality for the bit error rate test signal at each of the *N* optical transmitters and each of the *N* optical receivers when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the *N* optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value.

However, Waschka, Jr. discloses such comparing (col. 31, lines 3-4) and monitoring (col. 19, lines 30-59, col. 31, lines 5-21; note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) as part of a fault location technique (col. 19, lines 30-59). Although Juniper is silent about fault location, the APA teaches fault location for WDM optical communication systems. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement at least

some fault location teachings in the method of Juniper. One of ordinary skill in the art would have been motivated to do this since Juniper is silent about fault location and the APA teaches that fault location for WDM optical communication systems enables the common benefit of troubleshooting and repairing equipment related to located faults (Applicant's specification, p. 3, 2nd full paragraph), thus improving the quality and maintenance of the system.

Accordingly, at the time the invention was made, it would have also been obvious to one of ordinary skill in the art to further employ the fault location teachings of Waschka, Jr. in the method of Juniper in view of the APA. One of ordinary skill in the art would have been motivated to do this since, although the APA teaches that fault location may be desirable, Juniper is silent about the technical details of any particular fault location technique. Waschka, Jr. speaks into that silence by providing a fault location technique. Note that the fault location teachings of Waschka, Jr. may be suitable for the method of Juniper due to the similarities of the systems of Waschka, Jr. and Juniper, such as: BER testing units (Juniper, BERT on p. 8; Waschka, Jr., bit error rate test unit 22 in Fig. 8), cascaded optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., cascaded channel links in Fig. 1, col. 19, lines 25-28), and optical transmitter/receiver pairs (Juniper, transmitter/receiver pairs implied in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

Regarding claim 2, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein said predetermined system bit error rate is equal to the specified bit error rate for each of *N* optical communication channels (Waschka, Jr. teaches the same error rate for a system BER and a channel-specific BER, see "prescribed level" in claims 11-12).

Regarding claim 12, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein said monitoring monitors a received signal quality (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) for the bit error rate test signal (Waschka, Jr., "test sequence" and "test signal") supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input for the first optical transmitter to the output of the optical receiver *N*.

Regarding claim 13, Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

The method of claim 1, further comprising:

indicating that a bit error rate for each of the *N* optical communication channels is less than a specified bit error rate value when the measured bit error rate is less than or equal to the predetermined system bit error rate threshold.

However, Waschka, Jr. does disclose providing a BER indication for each of the channels when the measured system BER is unacceptable (Waschka, Jr., col. 19, lines 30-42). In the case that the measured system BER is acceptable (the measured bit error rate is less than or equal to the predetermined system bit error threshold), it would be obvious to a person of ordinary skill in the art to set the BER of each of the communication channels to be less than a specified BER, that is, the predetermined system bit error rate threshold. One of ordinary skill in the art would have been motivated to do this in order to keep the system BER less than the predetermined system bit error rate threshold. More exactly, the system BER is the cumulative sum of the channel BER values. Thus, if the BER of each communication channel were less than the predetermined system bit error rate threshold, the system BER would be less than that same threshold. Accordingly, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to also include said indicating. One of ordinary skill in the art would have been motivated to do this to show the status of the communication channels, informing maintenance personnel of the BER status of the communication channels (Waschka, Jr., col. 5, lines 22-27).

Regarding claim 14, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein the monitoring of the bit error rate is performed at an input (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) of each of the *N* optical transmitters and *N* optical receivers.

Regarding claim 20, Juniper in view of the APA and Waschka, Jr. discloses:

The method of claim 1, wherein the optical transmitters and receivers for the *N* optical communication channels are co-located (Juniper, co-location in a Sentry module in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

7. **Claims 3-11, 15-19, and 21-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper in view of the APA and Waschka, Jr. as applied to claim 1 above, and further in view of Bullock et al. (U.S. Patent No. 5,764,651, hereinafter "Bullock").

Regarding claim 3, Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

The method of claim 1, wherein said monitoring said signal quality includes a bit parity check.

Bullock teaches a method of testing a bit error rate for optical communication systems that includes a bit parity check (Bullock, col. 1, l. 57-67). This method is a part of a common and extremely well known communications network standard, SONET (Bullock, col. 1, l. 57). Juniper already employs SONET (Juniper, p. 3, 1st paragraph). Also, a bit parity check is known as a common technique for monitoring signal quality (BER), so a bit parity check would be an obvious method for one to employ in said monitoring of signal quality.

Regarding claim 4, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 1, wherein said monitoring includes monitoring a bit interleave parity (Bullock, col. 1, l. 57-67) for said bit parity check on each electrical signal in the *N* optical transmitter/receiver pairs.

Regarding claim 5, claim 5 is a method claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding steps in method claim 5. Claim 5 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

co-located plurality of optical transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

identifying at least one faulty communication channel from said plurality of optical communication channels (Waschka, Jr., col. 5, lines 45-49) by performing a bit parity check (Bullock, col. 1, l. 57-67) for each transmitter/receiver pair (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) because the measured bit error rate

(Waschka, Jr., col. 31, lines 3-4) is greater than a predetermined system bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 6, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, further comprising monitoring (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) a signal quality for the at least one faulty communication channel using an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33).

Regarding claim 7, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 6, wherein said internal performance monitor checks a signal transmitted through the at least one faulty communication channel (Waschka, Jr., col. 19, lines 25-42).

Regarding claim 8, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, further comprising passing said bit error rate test signal through said plurality of optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., channel links between stations, col. 19, lines 18-30).

Regarding claim 9, claim 9 is a system claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding means in system claim 9. Claim 9 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

a co-located plurality of transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

a diagnostic analyzer (Waschka, Jr., alarm units in Figs. 10-11) to analyze diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and said receivers and to identify (Waschka, Jr., col. 5, lines 40-42, col. 31, lines 19-21) at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check (Bullock, col. 1, l. 57-67) because said measured bit error rate (Waschka, Jr., col. 31, lines 3-4) is greater than said predetermined bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 10, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 9, further comprising an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33) coupled to said diagnostic analyzer.

Regarding claim 11, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The system of claim 10, wherein said internal performance monitor includes an error monitoring unit (Waschka, Jr., Fig. 7, col. 15, line 64 – col. 16, line 4).

Regarding claim 15, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 16, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the identifying at least one faulty communication channel monitors (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 5-21) the signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21), as the bit error rate test signal is propagating from the input for the first optical transmitter through the continuous cascade of transmitter/receiver pairs.

Regarding claim 17, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 9, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 18, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 9, wherein the diagnostic analyzer is configured to analyze the diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and receivers in response to monitoring (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 3-21) a signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21) input to each of said transmitters and said receivers (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42).

Regarding claim 19, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 18, wherein each of said transmitters and said receivers (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38; note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) is configured to monitor the signal quality of the bit error rate signal supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input of the first optical transmitter to the final optical receiver.

Regarding claim 21, Juniper in view of the APA, Waschka, Jr., and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Regarding claim 22, Juniper in view of the APA and Waschka, Jr. in view of Bullock disclose:

The method of claim 9, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Response to Arguments

8. Applicant's arguments, see p. 17-18, filed on 13 June 2005, with respect to the rejection(s) of claim(s) the independent claims have been fully considered and are persuasive. That is, Applicant's arguments are based on new limitations introduced into the independent claims by amendment. In particular, these new limitations are the ones related to the co-location of multiple receivers and the co-location of multiple transmitters. The previously applied prior art of record in the Office Action mailed on 14 March 2005 do not teach or suggest these co-location limitations. Therefore, the previous rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly discovered Juniper. In particular, note the co-location teachings in Fig. 9.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Green et al. and TTC are cited to show similar co-location teachings (Green et al., Fig. 3; TTC, Fig. 13).

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK

M. R. Sedighian
M. R. SEDIGHIAN
PRIMARY EXAMINER

REPLACEMENT SHEET

Disapproved by
Dsk
01 NOVEMBER 2005

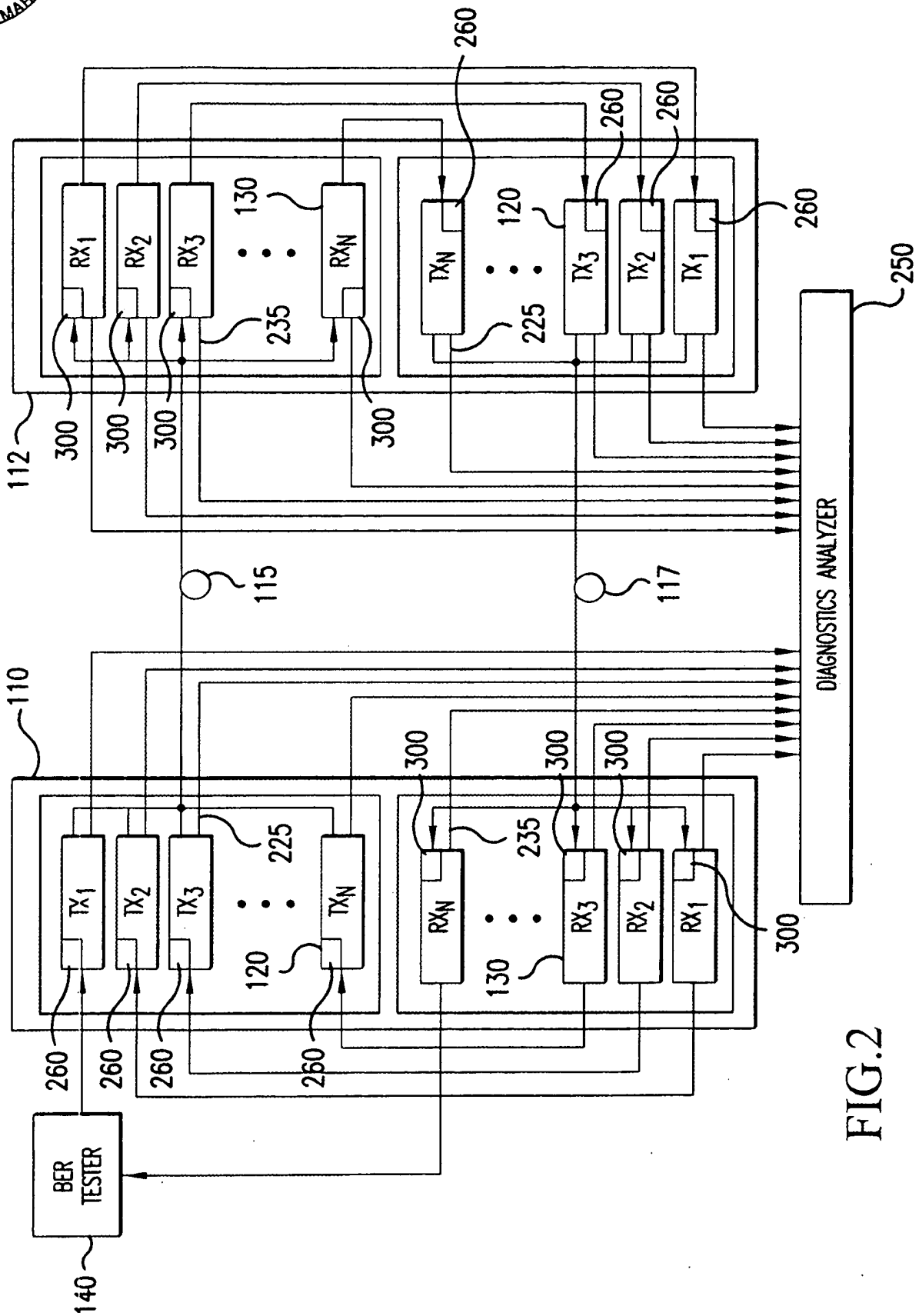

FIG.2